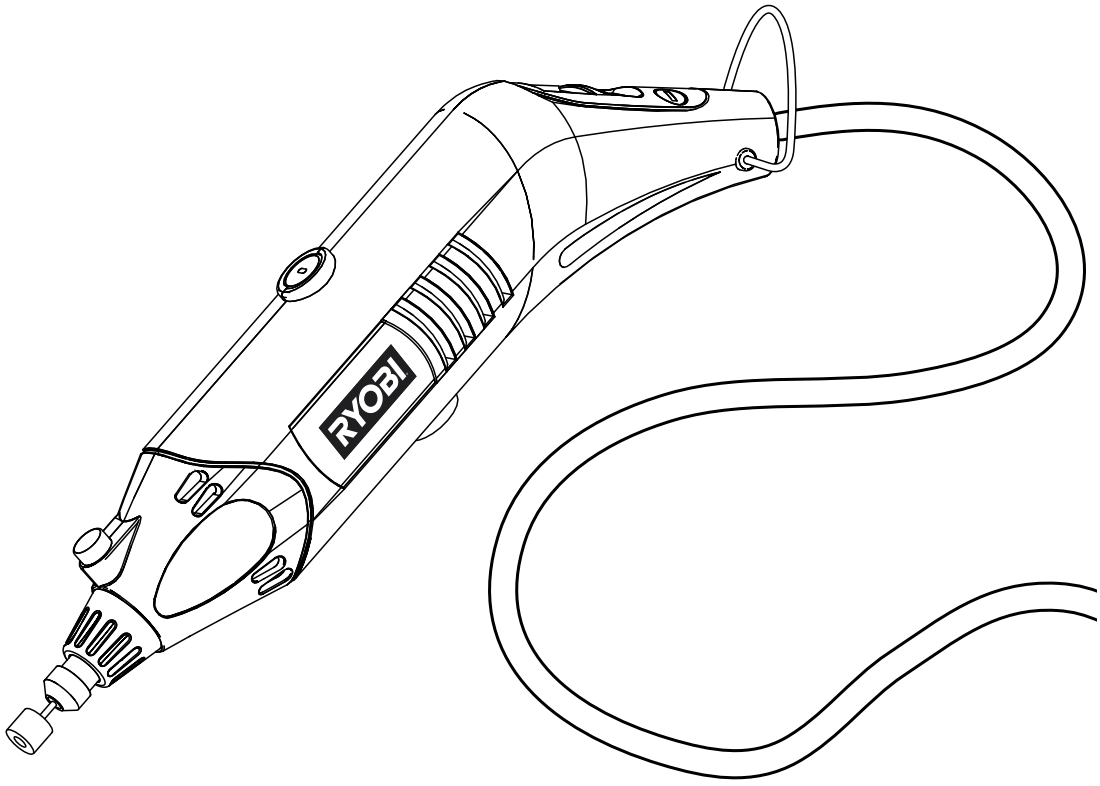
OPERATOR'S MANUAL

ROTARY TOOL KIT

HT230



Your rotary tool kit has been engineered and manufactured to our high standard for dependability, ease of operation, and operator safety. When properly cared for, it will give you years of rugged, trouble-free performance.

WARNING: To reduce the risk of injury, the user must read and understand the operator's manual before using this product.

Thank you for your purchase.

SAVE THIS MANUAL FOR FUTURE REFERENCE

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INTRODUCTION

This product has many features for making its use more pleasant and enjoyable. Safety, performance, and dependability have been given top priority in the design of this product making it easy to maintain and operate.

WARRANTY

RYOBI® POWER TOOL - LIMITED TWO YEAR WARRANTY AND 30 DAY EXCHANGE POLICY

One World Technologies, Inc., warrants its RYOBI® power tools with the following conditions:

30-DAY EXCHANGE POLICY: During the first 30 days after date of purchase, you may either request service under this warranty or you may exchange any RYOBI® power tool which does not work properly due to defective workmanship or materials by returning the power tool to the dealer from which it was purchased. To receive a replacement power tool or requested warranty service, you must present proof of purchase and return all original equipment packaged with the original product. The replacement power tool will be covered by the limited warranty for the balance of the two year period from the date of the original purchase.

WHAT THIS WARRANTY COVERS: This warranty covers all defects in workmanship or materials in your RYOBI® power tool for a period of two years from the date of purchase. With the exception of batteries, power tool accessories are warranted for ninety (90) days. Batteries are warranted for two years.

HOW TO GET SERVICE: Just return the power tool, properly packaged and postage prepaid, to an Authorized Service Center. You can obtain the location of the Service Center nearest you by contacting a service representative at One World Technologies, Inc., P.O. Box 1207, Anderson, SC 29622-1207, by calling 1-800-525-2579 or by logging on to www.ryobitools.com. When you request warranty service, you must also present proof of purchase documentation, which includes the date of purchase (for example, a bill of sale). We will repair any faulty workmanship, and either repair or replace any defective part, at our option. We will do so without any charge to you. We will complete the work in a reasonable time, but, in any case, within ninety (90) days or less.

WHAT'S NOT COVERED: This warranty applies only to the original purchaser at retail and may not be transferred. This warranty only covers defects arising under normal usage and does not cover any malfunction, failure or defects resulting from misuse, abuse, neglect, alteration, modification or repairs by other than Authorized Service Centers. One World Technologies, Inc. makes no warranties, representations or promises as to the quality or performance of its power tools other than those specifically stated in this warranty.

ADDITIONAL LIMITATIONS: Any implied warranties granted under state law, including warranties of merchantability or fitness for a particular purpose, are limited to two years from the date of purchase. One World Technologies, Inc. is not responsible for direct, indirect, or incidental damages, so the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

GENERAL SAFETY RULES

⚠ WARNING:

Read and understand all instructions. Failure to follow all instructions listed below, may result in electric shock, fire and/or serious personal injury.

SAVE THESE INSTRUCTIONS

WORK AREA

- **Keep your work area clean and well lit.** Cluttered benches and dark areas invite accidents.
- **Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.** Power tools create sparks which may ignite the dust or fumes.
- **Keep bystanders, children, and visitors away while operating a power tool.** Distractions can cause you to lose control.

ELECTRICAL SAFETY

- **Double insulated tools are equipped with a polarized plug (one blade is wider than the other). This plug will fit in a polarized outlet only one way. If the plug does not fit fully in the outlet, reverse the plug. If it still does not fit, contact a qualified electrician to install a polarized outlet. Do not change the plug in any way.** Double insulation ⧈ eliminates the need for the three-wire grounded power cord and grounded power supply system.
- **Avoid body contact with grounded surfaces such as pipes, radiators, ranges, and refrigerators.** There is an increased risk of electric shock if your body is grounded.
- **Don't expose power tools to rain or wet conditions.** Water entering a power tool will increase the risk of electric shock.
- **Do not abuse the cord. Never use the cord to carry the tools or pull the plug from an outlet. Keep cord away from heat, oil, sharp edges, or moving parts. Replace damaged cords immediately.** Damaged cords increase the risk of electric shock.
- **When operating a power tool outside, use an outdoor extension cord marked "W-A" or "W".** These cords are rated for outdoor use and reduce the risk of electric shock.

PERSONAL SAFETY

- **Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use tool while tired or under the influence of drugs, alcohol, or medication.** A moment of inattention while operating power tools may result in serious personal injury.
- **Dress properly. Do not wear loose clothing or jewelry. Contain long hair. Keep your hair, clothing, and gloves away from moving parts.** Loose clothes, jewelry, or long hair can be caught in moving parts.
- **Avoid accidental starting. Be sure switch is off before plugging in.** Carrying tools with your finger on the switch or plugging in tools that have the switch on invites accidents.
- **Remove adjusting keys or wrenches before turning the tool on.** A wrench or a key that is left attached to a rotating part of the tool may result in personal injury.
- **Do not overreach. Keep proper footing and balance at all times.** Proper footing and balance enables better control of the tool in unexpected situations.
- **Use safety equipment. Always wear eye protection.** Dust mask, nonskid safety shoes, hard hat, or hearing protection must be used for appropriate conditions.
- **Do not wear loose clothing or jewelry. Contain long hair.** Loose clothes, jewelry, or long hair can be drawn into air vents.
- **Do not use on a ladder or unstable support.** Stable footing on a solid surface enables better control of the tool in unexpected situations.

TOOL USE AND CARE

- **Use clamps or other practical way to secure and support the workpiece to a stable platform.** Holding the work by hand or against your body is unstable and may lead to loss of control.
- **Do not force tool. Use the correct tool for your application.** The correct tool will do the job better and safer at the rate for which it is designed.
- **Do not use tool if switch does not turn it on or off.** Any tool that cannot be controlled with the switch is dangerous and must be repaired.
- **Disconnect the plug from power source before making any adjustments, changing accessories, or storing the tool.** Such preventive safety measures reduce the risk of starting the tool accidentally.
- **Store idle tools out of the reach of children and other untrained persons.** Tools are dangerous in the hands of untrained users.
- **Maintain tools with care. Keep cutting tools sharp and clean.** Properly maintained tools with sharp cutting edges are less likely to bind and are easier to control.
- **Check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the tool's operation. If damaged, have the tool serviced before using.** Many accidents are caused by poorly maintained tools.
- **Use only accessories that are recommended by the manufacturer for your model.** Accessories that may be suitable for one tool, may become hazardous when used on another tool.
- **Keep the tool and its handle dry, clean and free from oil and grease.** Always use a clean cloth when cleaning. Never use brake fluids, gasoline, petroleum-based products, or any strong solvents to clean your tool. Following this rule will reduce the risk of loss of control and deterioration of the enclosure plastic.

GENERAL SAFETY RULES

SERVICE

- **Tool service must be performed only by qualified repair personnel.** Service or maintenance performed by unqualified personnel may result in a risk of injury.
- **When servicing a tool, use only identical replacement parts. Follow instructions in the Maintenance section of this manual.** Use of unauthorized parts or failure to follow Maintenance Instructions may create a risk of shock or injury.

SPECIFIC SAFETY RULES

- **Hold tool by insulated gripping surfaces when performing an operation where the cutting tool may contact hidden wiring or its own cord.** Contact with a "live" wire will make exposed metal parts of the cutting tool "live" and shock the operator.
- **Accessories must be rated for at least the speed recommended on the tool warning label.** Wheels and other accessories running over rated speed can fly apart and cause injury.
- **Know your power tool. Read operator's manual carefully. Learn its applications and limitations, as well as the specific potential hazards related to this tool.** Following this rule will reduce the risk of electric shock, fire, or serious injury.
- **Always wear safety glasses. Everyday eyeglasses have only impact-resistant lenses; they are NOT safety glasses.** Following this rule will reduce the risk of serious personal injury.
- **Protect your lungs. Wear a face or dust mask if the operation is dusty.** Following this rule will reduce the risk of serious personal injury.
- **Protect your hearing. Wear hearing protection during extended periods of operation.** Following this rule will reduce the risk of serious personal injury.
- **Inspect tool cords periodically and, if damaged, have repaired at your nearest Authorized Service Center. Constantly stay aware of cord location.** Following this rule will reduce the risk of electric shock or fire.
- **Check damaged parts. Before further use of the tool, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced by an authorized service center.** Following this rule will reduce the risk of shock, fire, or serious injury.
- **Make sure your extension cord is in good condition. When using an extension cord, be sure to use one heavy enough to carry the current your product will draw. A wire gauge size (A.W.G.) of at least 16 is recommended for an extension cord 50 feet or less in length. A cord exceeding 100 feet is not recommended. If in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord.** An undersized cord will cause a drop in line voltage resulting in loss of power and overheating.
- **Inspect for and remove all nails from lumber before using this tool.** Following this rule will reduce the risk of serious personal injury.
- **Do not operate the flexible shaft with a sharp bend.** Over bending the shaft can generate excessive heat on the jacket or hand piece. The recommended minimum bend radius is 6 in.
- **After changing bits or making any adjustments, make sure the collet nut and any other adjustment devices are securely tightened.** A loose adjustment device can unexpectedly shift, causing loss of control. Loose rotating components will be violently thrown.
- **Do not reach in the area of the spinning bit.** The proximity of the spinning bit to your hand may not always be obvious.
- **Do not grind or sand heat flammable materials.** Sparks from the wheel could ignite these materials.
- **This product is not intended for use as a dental drill or in human or veterinary medical applications.** Serious injury may result.
- **When using steel screws, cut-off wheels, high speed cutters, or tungsten carbide cutters, always have the work securely clamped. Never attempt to hold the work with one hand while using any of these accessories.**
- **If the power supply cord is damaged,** it must be replaced only by the manufacturer or by an authorized service center to avoid risk.
- **Save these instructions.** Refer to them frequently and use them to instruct others who may use this tool. If you loan someone this tool, loan them these instructions also.

SYMBOLS

Some of the following symbols may be used on this product . Please study them and learn their meaning. Proper interpretation of these symbols will allow you to operate the product better and safer.

SYMBOL	NAME	DESIGNATION/EXPLANATION
V	Volts	Voltage
A	Amperes	Current
Hz	Hertz	Frequency (cycles per second)
W	Watt	Power
min	Minutes	Time
~	Alternating Current	Type of current
⎓	Direct Current	Type or a characteristic of current
n_o	No Load Speed	Rotational speed, at no load
⧈	Class II Construction	Double-insulated construction
.../min	Per Minute	Revolutions, strokes, surface speed, orbits etc., per minute
	Wet Conditions Alert	Do not expose to rain or use in damp locations.
	Read The Operator's Manual	To reduce the risk of injury, user must read and understand operator's manual before using this product.
	Eye Protection	Always wear safety goggles or safety glasses with side shields and, as necessary, a full face shield when operating this product.
	Safety Alert	Precautions that involve your safety.
	No Hands Symbol	Failure to keep your hands away from the blade will result in serious personal injury.
	No Hands Symbol	Failure to keep your hands away from the blade will result in serious personal injury.
	No Hands Symbol	Failure to keep your hands away from the blade will result in serious personal injury.
	No Hands Symbol	Failure to keep your hands away from the blade will result in serious personal injury.
	Hot Surface	To reduce the risk of injury or damage, avoid contact with any hot surface.

SYMBOLS

The following signal words and meanings are intended to explain the levels of risk associated with this product.

SYMBOL	SIGNAL	MEANING
⚠	**DANGER:**	Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.
⚠	**WARNING:**	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.
⚠	**CAUTION:**	Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury.
	CAUTION:	(Without Safety Alert Symbol) Indicates a situation that may result in property damage.

SERVICE

Servicing requires extreme care and knowledge and should be performed only by a qualified service technician. For service we suggest you return the product to the nearest **AUTHORIZED SERVICE CENTER** for repair. When servicing, use only identical replacement parts.

⚠ WARNING:

To avoid serious personal injury, do not attempt to use this product until you read thoroughly and understand completely the operator's manual. If you do not understand the warnings and instructions in the operator's manual, do not use this product. Call Ryobi customer service for assistance.

⚠ WARNING:

The operation of any power tool can result in foreign objects being thrown into your eyes, which can result in severe eye damage. Before beginning power tool operation, always wear safety goggles or safety glasses with side shields and, when needed, a full face shield. We recommend Wide Vision Safety Mask for use over eyeglasses or standard safety glasses with side shields. Always use eye protection which is marked to comply with ANSI Z87.1.

SAVE THESE INSTRUCTIONS

ELECTRICAL

DOUBLE INSULATION

Double insulation is a concept in safety in electric power tools, which eliminates the need for the usual three-wire grounded power cord. All exposed metal parts are isolated from the internal metal motor components with protecting insulation. Double insulated tools do not need to be grounded.

⚠ WARNING:

The double insulated system is intended to protect the user from shock resulting from a break in the tool's internal insulation. Observe all normal safety precautions to avoid electrical shock.

NOTE: Servicing of a product with double insulation requires extreme care and knowledge of the system and should be performed only by a qualified service technician. For service, we suggest you return the product to your nearest authorized service center for repair. Always use original factory replacement parts when servicing.

ELECTRICAL CONNECTION

This product has a precision-built electric motor. It should be connected to a **power supply that is 120 volts, 60 Hz, AC only (normal household current).** Do not operate this product on direct current (DC). A substantial voltage drop will cause a loss of power and the motor will overheat. If the product does not operate when plugged into an outlet, double-check the power supply.

EXTENSION CORDS

When using a power tool at a considerable distance from a power source, be sure to use an extension cord that has the capacity to handle the current the product will draw. An undersized cord will cause a drop in line voltage, resulting in overheating and loss of power. Use the chart to determine the minimum wire size required in an extension cord. Only round jacketed cords listed by Underwriter's Laboratories (UL) should be used.

When working outdoors with a product , use an extension cord that is designed for outside use. This type of cord is designated with "WA" on the cord's jacket.

Before using any extension cord, inspect it for loose or exposed wires and cut or worn insulation.

**Ampere rating (on product data plate)

	0-2.0	2.1-3.4	3.5-5.0	5.1-7.0	7.1-12.0	12.1-16.0
Cord Length	**Wire Size (A.W.G.)**					
25'	16	16	16	16	14	14
50'	16	16	16	14	14	12
100'	16	16	14	12	10	—

***Used on 12 gauge - 20 amp circuit.*
NOTE: AWG = American Wire Gauge

⚠ WARNING:

Keep the extension cord clear of the working area. Position the cord so that it will not get caught on lumber, tools, or other obstructions while you are working with a power tool. Failure to do so can result in serious personal injury.

⚠ WARNING:

Check extension cords before each use. If damaged replace immediately. Never use the product with a damaged cord since touching the damaged area could cause electrical shock resulting in serious injury.

FEATURES

PRODUCT SPECIFICATIONS

Collet ..... 1/8 in.
Switch..... Variable Speed
No Load Speed ..... 10,000-35,000 r/min. (RPM)
Input ..... 120 V, 60 Hz, AC only, 1.2 Amps

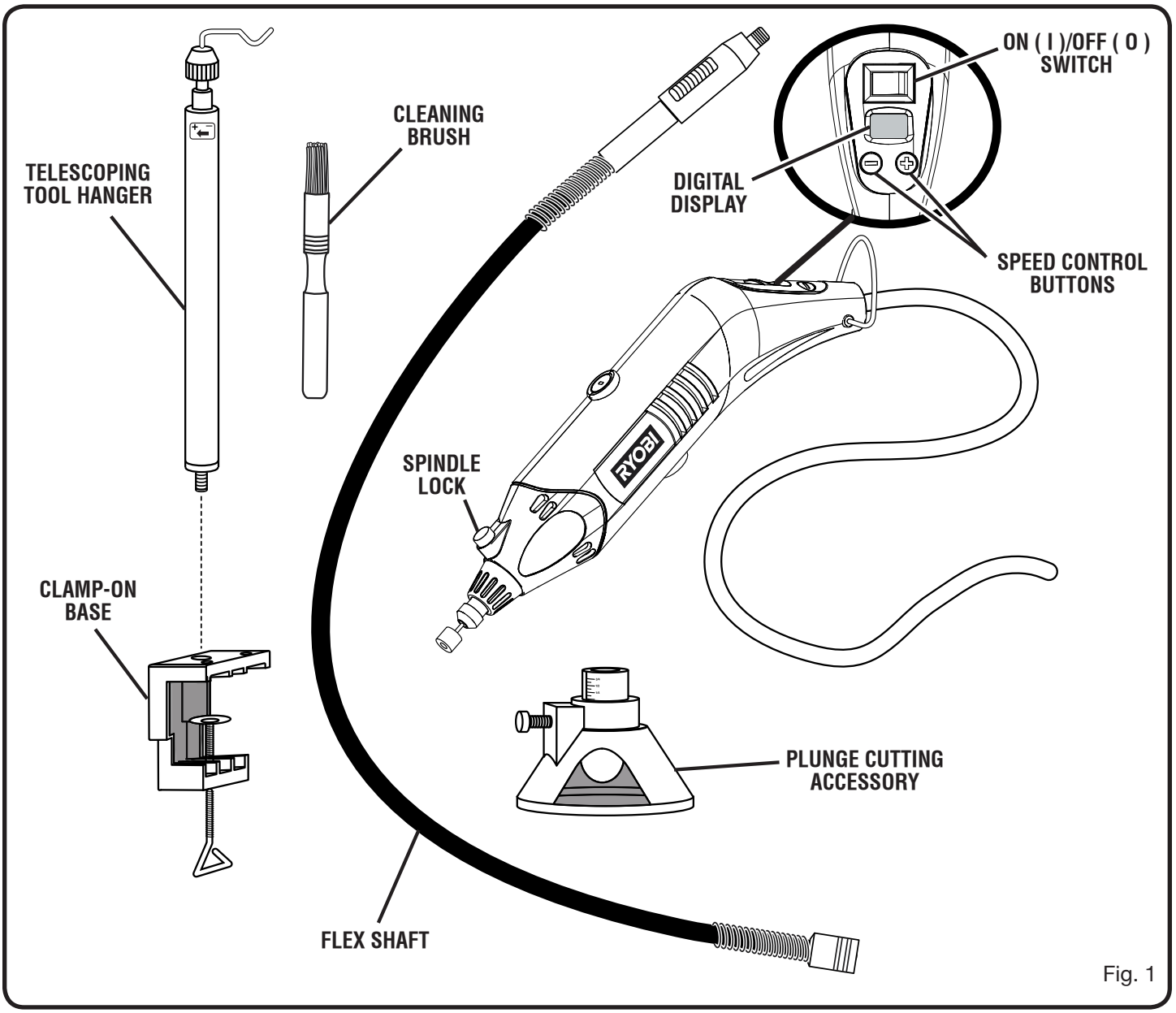

Fig. 1

FEATURES

KNOW YOUR ROTARY TOOL KIT

See Figure 1.

The safe use of this product requires an understanding of the information on the product and in this operator's manual as well as a knowledge of the project you are attempting. Before use of this product, familiarize yourself with all operating features and safety rules.

CLEANING BRUSH

Use the cleaning brush to quickly clean the workpiece, rotary tool, and accessories.

DIGITAL DISPLAY

The speed of the tool is conveniently shown on the digital display.

FLEX SHAFT

A flexible shaft can be connected to the rotary tool for working in hard to reach areas and for better control during delicate work.

PLUNGE CUTTING ACCESSORY

The plunge cutting accessory attaches to the end of the rotary tool. Depth of cut can be adjusted in 1/8 in. increments up to 1 in.

SPEED CONTROL BUTTONS

The speed control buttons allow you to easily select tool speed.

TELESCOPING TOOL HANGER

The telescoping tool hanger provides a convenient place to hang the rotary tool while the flex shaft is in use.

ASSEMBLY

UNPACKING

This product has been shipped completely assembled.

- Carefully remove the product and any accessories from the box. Make sure that all items listed in the packing list are included.
- Inspect the product carefully to make sure no breakage or damage occurred during shipping.
- Do not discard the packing material until you have carefully inspected and satisfactorily operated the product.
- If any parts are damaged or missing, please call 1-800-525-2579 for assistance.

PACKING LIST

Rotary Tool
Accessories (See Accessory Chart)
Case
Locking Key
Wrench
Cleaning Brush
Plunge Cutting Accessory
Collet (4)
Telescoping Tool Hanger
Flex Shaft
Tool Hanger Clamp-on Base
Operator's Manual

⚠ WARNING:

If any parts are damaged or missing do not operate this product until the parts are replaced. Failure to heed this warning could result in serious personal injury.

⚠ WARNING:

Do not attempt to modify this product or create accessories not recommended for use with this product. Any such alteration or modification is misuse and could result in a hazardous condition leading to possible serious personal injury.

⚠ WARNING:

Do not connect to power supply until assembly is complete. Failure to comply could result in accidental starting and possible serious personal injury.

OPERATION

⚠ WARNING:

Do not allow familiarity with products to make you careless. Remember that a careless fraction of a second is sufficient to inflict serious injury.

⚠ WARNING:

Always wear safety goggles or safety glasses with side shields when operating power tools. Failure to do so could result in objects being thrown into your eyes resulting in possible serious injury.

⚠ WARNING:

Do not use any attachments or accessories not recommended by the manufacturer of this product. The use of attachments or accessories not recommended can result in serious personal injury.

APPLICATIONS

You may use this product for the purposes listed below:

- Cutting
- Sanding
- Polishing and buffing
- Engraving
- Drilling

TURNING THE ROTARY TOOL ON/OFF

See Figure 2.

- To turn the tool **ON**: push the ON (I)/OFF (O) switch to the ON (I) position.
- To turn the tool **OFF**: push the ON (I)/OFF (O) switch to the OFF (O) position.

CAUTION:

To prevent damage to the spindle or spindle lock, always allow motor to come to a complete stop before engaging the spindle lock.

CHANGING COLLETS

See Figure 3.

Two 1/8 in. collets, one 1/16 in. collet, and one 3/32 in. collet are included with the rotary tool to accommodate different shank sizes.

To change the collet:

- Unplug the rotary tool.
- Press and hold the spindle lock, and rotate the shaft by hand until the spindle lock engages the shaft, preventing further rotation.

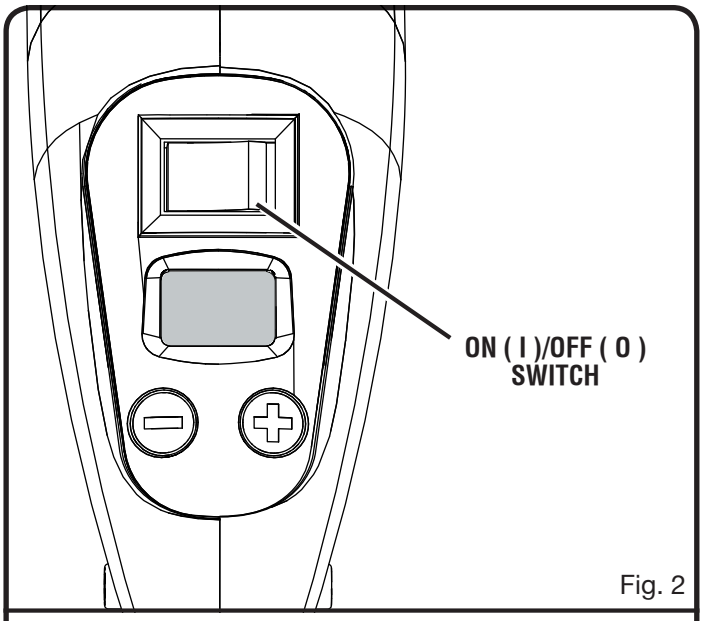

Fig. 2

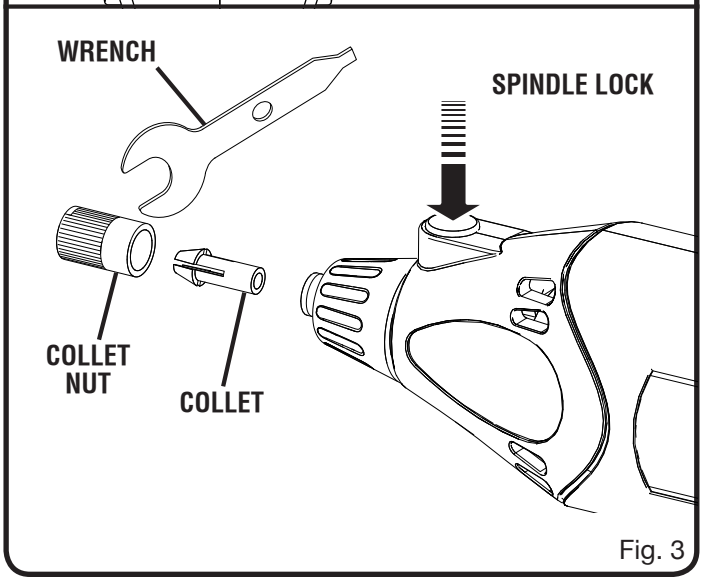

Fig. 3

- With the spindle lock engaged, use the collet wrench to loosen the collet nut, if necessary.
- Remove the collet nut and old collet using provided collet wrench, if necessary.
- Insert the unslotted end of the collet in the hole in the end of the tool shaft.
- Replace the collet nut on the shaft.

⚠ WARNING:

Always use the collet which matches the shank size of the accessory you plan to use. Never force a large diameter shank into a collet. The accessory should fit smoothly into the collet, but you should be able to tighten the accessory firmly and securely with the provided wrench.

OPERATION

ACCESSORY CHART		
Quantity	**Accessory**	**Application**
6	Orange 120-Grit Aluminum Oxide Grinding Wheel Bits	Ferrous materials: casting, welds, rivets, rust
4	Green 120-Grit Silicon Carbide Grinding Wheel Bits	Non-ferrous materials: stone, ceramics, porcelain, glass
3	3/4 in. Wire Circle Brushes (nylon, brass, stainless steel)	Nylon brush: removing dirt and dust Brass and steel brush: removing rust
4	Wire Cup Brushes (3/16 in. nylon, 3/16 in. and 5/8 in. brass, 5/8 in. stainless steel)	Nylon brush: removing dirt and dust Brass and steel brush: removing rust
1	1/4 in. Drum Sander Mandrel	Attaching sanding drums
1	1/2 in. Drum Sander Mandrel	Attaching sanding drums
4	Green Rubber Polishing Bits	Ferrous materials: removing small burrs and scratch marks
36	15/16 in. X 1/64 in. Cut-off Discs	Cutting ferrous materials
1	Polishing Compound Vial	Polishing
72	15/16 in. X 1/32 in. Cut-off Discs	Cutting ferrous materials
6	3/4 in. Pink 220-Grit Aluminum Oxide Grinding Wheels	Ferrous materials: casting, welds, rivets, rust
4	1/2 in. Felt Polishing Wheels	Buffing to a bright finish with polishing compound
1	7/8 in. X 5/32 in. Rubber Emery Wheel	Buffing to a bright finish with polishing compound
17	1/4 in. X 1/2 in. Sanding Drums (60-Grit and 120-Grit)	Sanding
17	1/2 in. X 1/2 in. Sanding Drums (60-Grit and 120-Grit)	Sanding
6	3/4 in. Green 180-Grit Aluminum Oxide Grinding Wheels	Ferrous materials: removing small burrs and scratch marks
1	Silicon Carbide Dressing Stone	Bringing shape back to parabolic shaped grinding attachments
1	Cloth Polishing Wheels	Polishing and buffing
1	Diamond Cut-off Wheel	Cutting marble, concrete, brick, porcelain, ceramic, epoxy, and hard woods
1	1 in. Felt Polishing Wheel	Polishing and buffing
1	Felt Polishing Drum	Polishing and buffing
5	1-1/4 in. Fiberglass Cut-off Wheels	Cutting ferrous materials
1	1/8 in. Screw Mandrel	Attaching felt attachments
3	Mandrels (1/8 in. shank X 1/16 in. and 1/8 in. shank X 3/32 in.)	Attaching cut-off discs, cut-off wheels, grinding wheels, and emery wheel
1	1-1/4 in. X 3/8 in. 80-Grit Sanding Flap Wheel	Removing rust and mold
14	High Speed Steel Drill Bits (1/16 in., 3/32 in., 1/8 in.)	Drilling
5	Diamond Wheel Points	Cutting, engraving, carving, and fine detailing work Wood, jade, ceramic, glass, hardened steel, and semi-precious stones
1	1/8 in. Drywall Cutting Bit	Cutting drywall

OPERATION

⚠ WARNING:

If you are changing an accessory immediately after use, be careful not to touch the collet, collet nut, or the accessory with your hands or fingers. You will get burned because of the heat buildup from cutting. Always use the wrench provided.

CAUTION:

To prevent damage to the spindle or spindle lock, always allow motor to come to a complete stop before engaging the spindle lock.

INSTALLING ACCESSORIES

See Figures 4 - 5.

- Unplug the rotary tool.
- Press and hold the spindle lock, and rotate the shaft by hand until the spindle lock engages the shaft, preventing further rotation.
- With the spindle lock engaged, use the collet wrench to loosen the collet nut, if necessary.
- Insert the shank of the accessory into the collet until the shank bottoms out, then pull it out 1/16 in. to allow for expansion when the accessory gets hot.
- With the spindle lock engaged, tighten the collet nut with the provided wrench until the accessory shank is gripped by the collet. Avoid excess tightening of the collet nut.

REMOVING ACCESSORIES

See Figures 4 - 5.

- Unplug the rotary tool.
- With the spindle lock engaged, loosen the collet nut with the provided wrench.
- Remove the accessory.

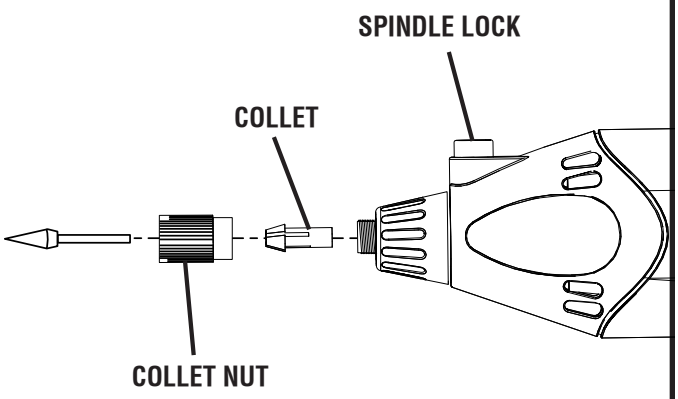

Fig. 4

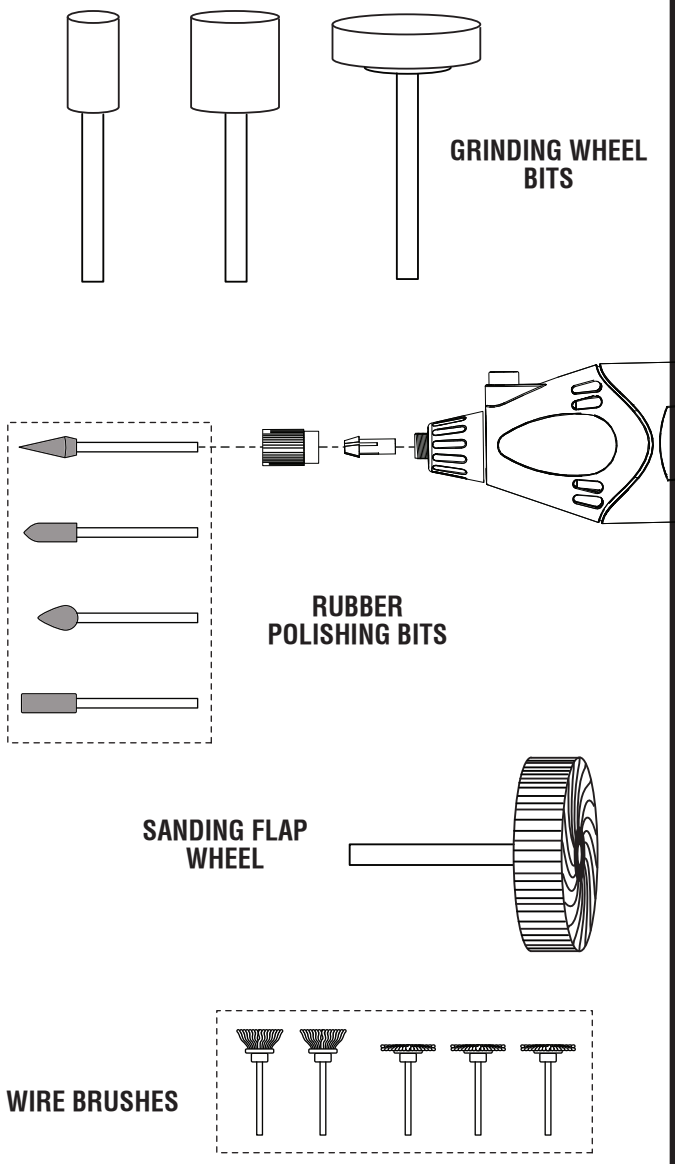

Fig. 5

OPERATION

CAUTION:

To prevent damage to the spindle or spindle lock, always allow motor to come to a complete stop before engaging the spindle lock.

USING THE MANDRELS

See Figures 6 - 8.

Three types of mandrels have been included for use with this kit. The standard mandrel is used with the cut-off discs, grinding wheels, emery wheel, and cut-off wheels. The screw mandrel is used with the polishing wheels and polishing drum. The drum mandrel is used with the sanding drums.

To install:

- Unplug the rotary tool.
- Install the mandrel.

If using the standard mandrel:

- Press and hold the spindle lock.
- Insert the slot end of the provided wrench into the slot on top of the mandrel and unscrew.
- Remove mandrel screw and washer.
- Place desired accessory over mandrel shaft and align accessory hole with mandrel hole.
- Insert mandrel screw with washer through the accessory and mandrel shaft holes.

  NOTE: The mandrel washer should be placed between the mandrel screw and the accessory.
- Tighten using provided wrench.

If using the screw mandrel:

- Align desired accessory hole with mandrel screw head.
- Screw accessory onto mandrel by twisting clockwise until secure.

If using the drum mandrel:

- Align appropriate sized sanding drum over mandrel and push down to completely cover drum end of mandrel.

  NOTE: If necessary, tighten the screw on the drum mandrel head to expand the drum and securely hold the sanding drum in place.

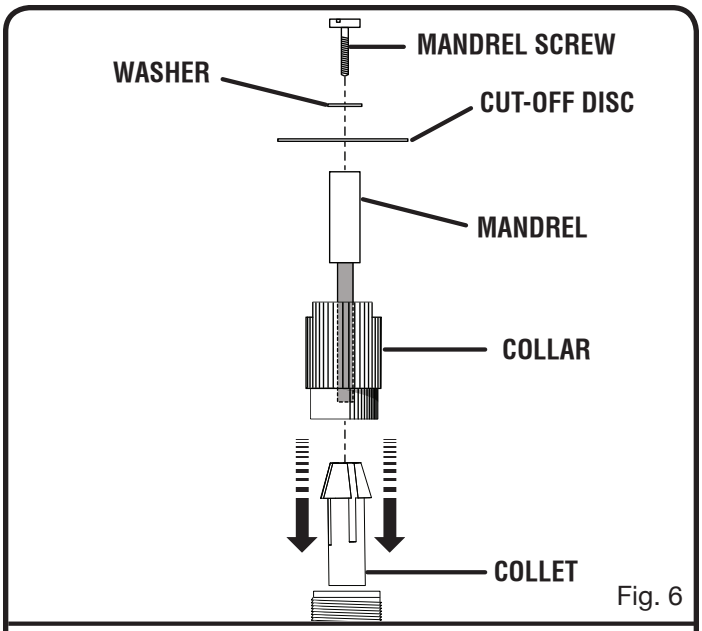

Fig. 6

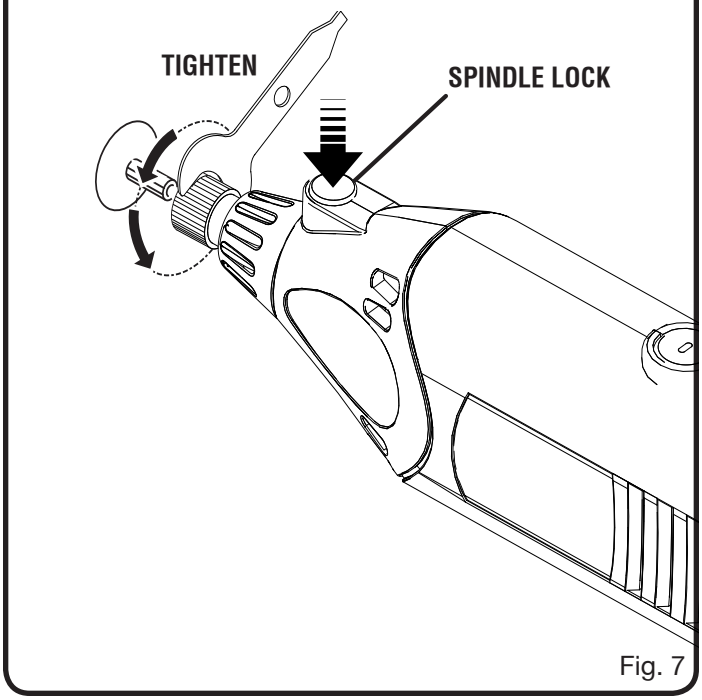

Fig. 7

OPERATION

BALANCING ACCESSORIES

For precision work, it is important that all accessories be properly balanced. To balance an accessory, slightly loosen the collet nut and give the accessory or collet a 1/4 in. turn. You should be able to tell by the sound and feel if the accessory is running in balance. Continue adjusting in this fashion until the best balance is achieved. Replace accessories if they become damaged or unbalanced.

SELECTING THE RIGHT SPEED

See Figure 9.

The rotary tool has a speed range of 10,000 to 35,000 RPM. To select the right speed for each job, use a practice piece of material. Vary speed to find the best speed for the accessory you are using and the job to be done.

The digital display shows the speed setting of the tool using the numbers 10-35. Press the **+** speed control button to increase the speed, and press the **–** speed control button to decrease the speed. Speed settings are approximately one thousandth of the RPM. For example, a speed setting of 10 is approximately 10,000 RPM, and a speed setting of 35 is approximately 35,000 RPM.

Refer to the Speed Dial Settings table to determine the proper speed, based on the material being worked and the type of accessory being used.

SLOWER SPEEDS

Certain materials, some plastics for example, require a relatively slow speed because the friction of the tool generates heat and causes the plastic to melt at high speed.

Slow speeds (15,000 RPM or less) are usually best for polishing operations using the polishing accessories. They may also be best for working on delicate projects, delicate wood carving and fragile model parts.

⚠ WARNING:

Wire brushes must never be operated at speeds higher than 15,000 RPM. Wire brushes must run at least one minute before use. During this period, no one should stand in front of or in line with the rotating brush. Failure to heed this warning could result in serious personal injury.

Higher speeds are better for carving, cutting, and shaping wood.

Hardwoods, metals, and glass require high speed operation. Drilling should also be done at high speeds.

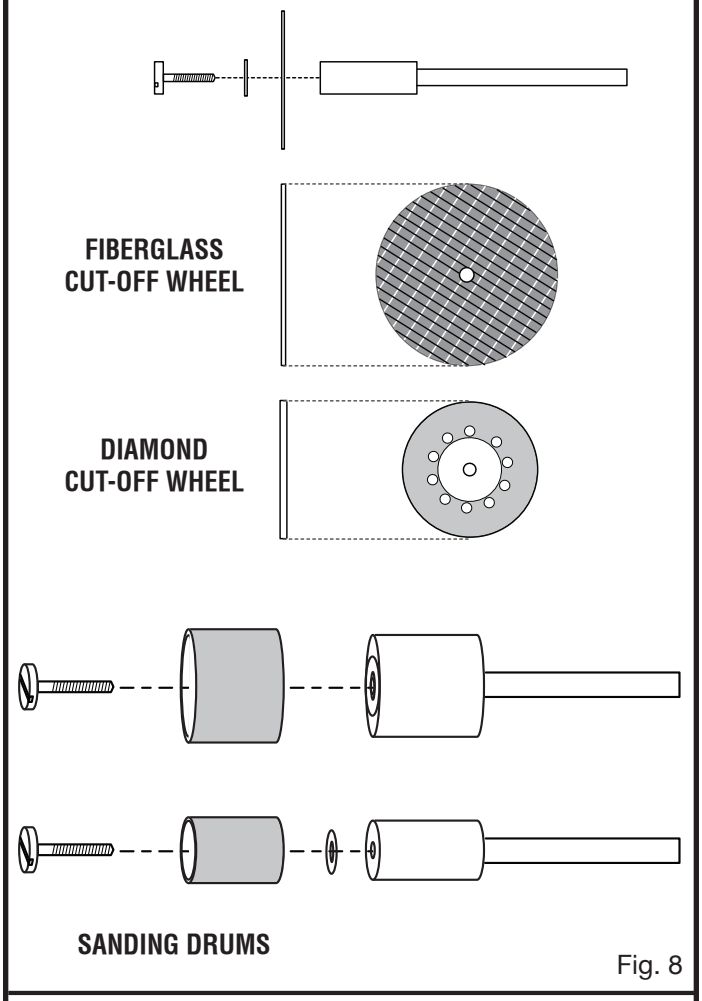

Fig. 8

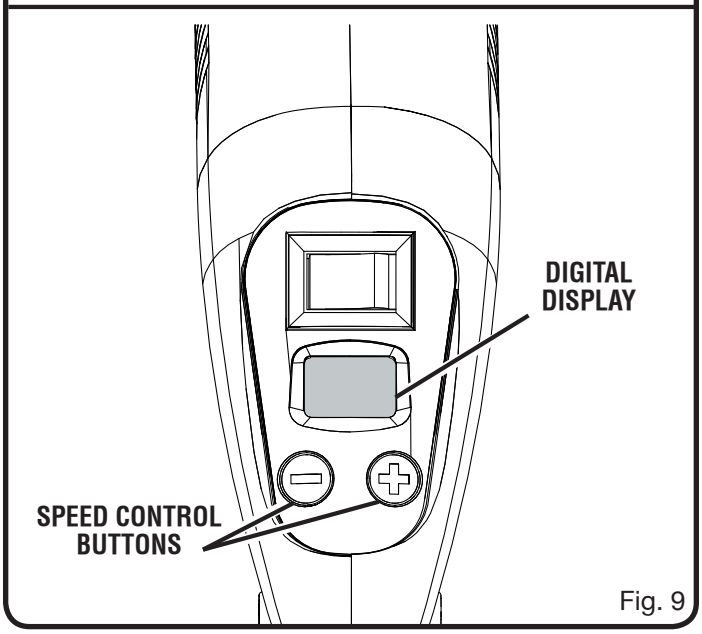

Fig. 9

OPERATION

To determine the optimum operational speed for different materials and accessories, refer to the Speed Dial Settings table. Look this table over and become familiar with it.

The best way to determine the correct speed for work on any material is to practice for a few minutes on a piece of scrap, even after referring to the table. You can quickly learn that a slower or faster speed is more effective just by observing what happens when you make a pass or two at different speeds.

When working with a scrap piece of plastic, start at a slow rate of speed and increase the speed until you observe whether the plastic is melting at the point of contact; reduce the speed slightly to get optimum working speed without melting the workpiece.

NOTE:

- Plastic and materials that melt at low temperatures should be cut at low speeds.
- Soft wood should be cut at high speed.
- Aluminum, tin, and copper, lead, and zinc alloys may be cut at any speed, depending on the type of cutting being done. Use paraffin or other suitable lubricant on the cutter to prevent the cut material from adhering to the cutter teeth.

⚠ WARNING:

Wire brushes must never be operated at speeds higher than 15,000 RPM. Wire brushes must run at least one minute before use. During this period, no one should stand in front of or in line with the rotating brush. Failure to heed this warning could result in serious personal injury.

SPEED DIAL SETTINGS

Type of Accessory	Soft Wood	Hard Wood	Laminates Plastics	Steel	Aluminum, Brass, Etc.	Shell/ Stone	Ceramic	Glass
Cut-off Discs	25-30	18-30	10-18	10-18	10-30	—	—	—
Engraving Cutter	25-30	25-30	15-25	25-30	10-18	—	—	—
Rubber Polishing Points	—	—	—	10-15	10-15	—	—	—
Aluminum Oxide Grinding Stones	—	—	10-15	—	10-18	10-18	—	—
Silicon Carbide Grinding Stone	—	—	—	—	10-15	10-15	12-15	10-15
Wire Wheels	10-15	10-15	—	10-15	10-15	10-15	—	—

OPERATION

OPERATING THE ROTARY TOOL

See Figure 10.

Learning to use the rotary tool:

- Hold the tool in your hand and get used to its weight, balance, and the taper of the housing. This taper permits the tool to be grasped like a pencil.
- Examine the rotary tool accessories carefully. Damaged accessories can fly apart as they come up to speed and should not be used. The use of damaged accessories can result in serious personal injury.
- Practice on scrap materials first to see how the tool operates. Keep in mind that the work is done by the speed of the tool and by the accessory in the collet. You should not lean on or push the tool into the work.

It is best to make a series of passes with the tool rather than attempt to do all the work in one pass. To make a cut, pass the tool back and forth over the work like you would a small paint brush. Cut a little material on each pass until you reach the desired depth. For most work, a gentle touch is best; you will have greater control, make fewer errors, and get the most efficient work out of the accessory.

For the best control in close work, grip the tool like a pencil between your thumb and forefinger.

A "hand grip" method of holding the tool is used for operations such as grinding a flat surface or using cut-off discs.

To operate the rotary tool:

- Secure all work in a vise or clamp to a workbench to prevent it from moving under the tool.
- Hold the tool in front and away from you, keeping the tool accessory clear of the workpiece.
- Turn on the tool and let the motor and accessory build up to full speed.
- Lower the tool gradually until the accessory contacts the workpiece.
- Move the tool continuously at a steady, consistent pace.
- Use just enough pressure to keep the tool from chattering or bouncing.

NOTE: Heavy pressure will decrease the tool's speed and put a strain on the motor. The weight of the tool alone is adequate for most jobs.

- Lift the tool away from the workpiece before turning off the tool.

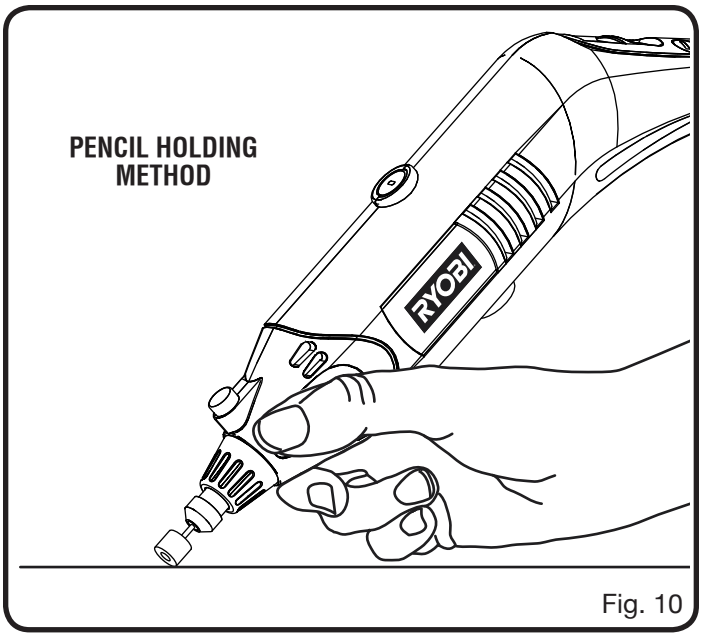

Fig. 10

OPERATION

TELESCOPING TOOL HANGER WITH CLAMP ON BASE

See Figure 11.

The telescoping tool hanger provides a convenient place to hang the rotary tool while the flex shaft is in use.

To clamp the base to a worktable:

- Turn the clamp screw counterclockwise to open the clamping area.
- Place clamp over edge of worktable.
- Turn the clamp screw clockwise until the clamp is secure.

To attach the tool hanger to the base:

- Turn the lower part of the tool hanger clockwise to unlock.
- Pull the tool hanger up to lengthen or push the tool hanger down to shorten its height.
- Turn the lower part of the tool hanger counterclockwise to lock into place.
- Screw the tool hanger into the top of the clamp.

NOTE: When using the flex shaft, hang the rotary tool from the tool hanger hook using the hook located on the back of the rotary tool.

CAUTION:

To prevent damage to the spindle or spindle lock, always allow motor to come to a complete stop before engaging the spindle lock.

OPERATING THE FLEX SHAFT

See Figures 12 - 14.

The 1/8 in. collet must be inserted into the rotary tool before the flex shaft can be installed.

To install the flex shaft:

- Unplug the rotary tool.
- Loosen collet sleeve by turning counterclockwise and remove.
- Press and hold the spindle lock, and rotate the shaft by hand until the spindle lock engages the shaft, preventing further rotation.
- With the spindle lock engaged, use the collet wrench to loosen the collet nut, if necessary.
- Remove collet nut and collet.
- Insert the 1/8 in. collet.
- Replace the collet nut and tighten loosely.

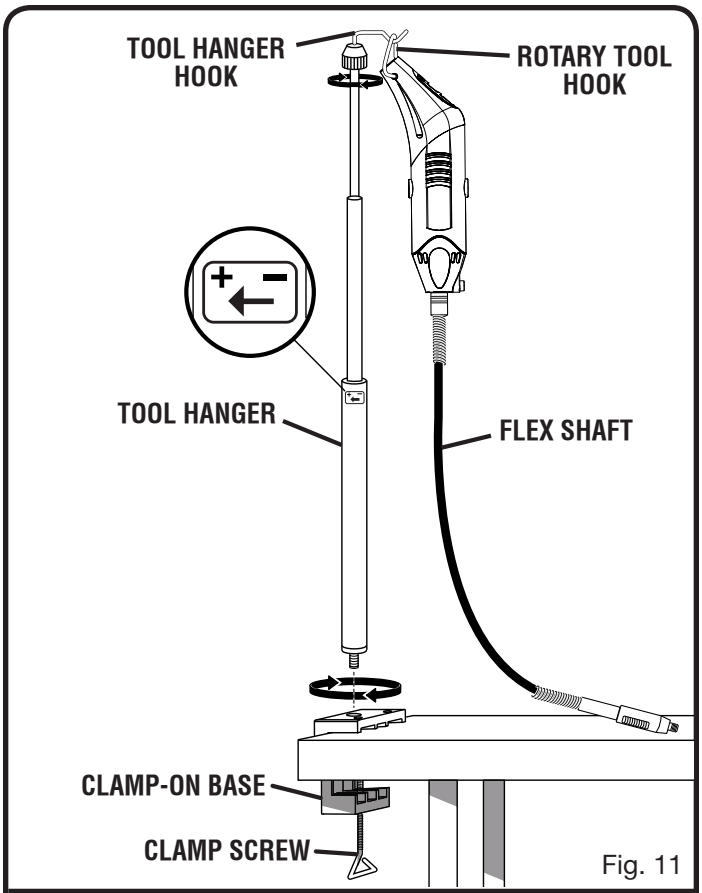

Fig. 11

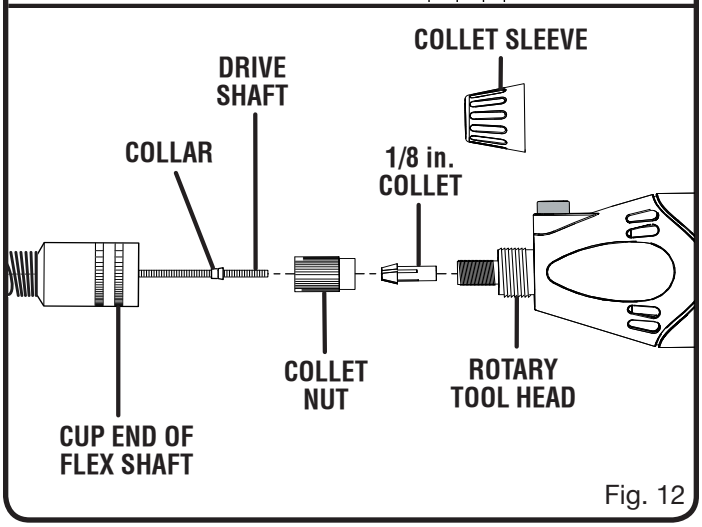

Fig. 12

- Insert drive shaft into collet nut until the collar meets the collet nut.
- Tighten the collet nut completely, keeping collar in contact with collet nut.
- Insert cup end of flex shaft onto rotary tool head. Turn clockwise to tighten.

OPERATION

To install accessories into the flex shaft:

- Unplug the rotary tool.
- Locate the hole behind the collet nut in the flex shaft body.
- Turn the collet nut until the hole in the flex shaft body aligns with the hole visible inside the flex shaft.
- Insert provided locking key into the aligned holes to lock collet nut into place.
- Insert the shank of the accessory into the collet nut until the shank bottoms out, then pull it out 1/16 in. to allow for expansion when the accessory gets hot.
- With the key still in place, tighten the collet nut with the provided wrench until the accessory shank is gripped by the collet. Avoid excess tightening of the collet nut.
- Remove the key.

To remove accessories from the flex shaft:

- Unplug the rotary tool.
- Locate hole behind the collet nut in the flex shaft body.
- Turn collet nut until the hole in the flex shaft body aligns with the hole visible inside the flex shaft.
- Insert provided locking key into the aligned holes to lock collet nut into place.
- With the hex still in place, loosen the collet nut with the provided wrench.
- Remove the accessory.

To operate the rotary tool using the flex shaft:

- Secure all work in a vise or clamp to a workbench to prevent it from moving under the tool.
- Grip the flex shaft along the grooved gripping section.
- Hold the tool in front and away from you, keeping the tool accessory clear of the workpiece.
- Turn on the tool and let the motor and accessory build up to full speed.
- Lower the tool gradually until the accessory contacts the workpiece.
- Move the tool continuously at a steady, consistent pace.
- Use just enough pressure to keep the tool from chattering or bouncing.

NOTE: Heavy pressure will decrease the tool's speed and put a strain on the motor. The weight of the tool alone is adequate for most jobs.

- Lift the tool away from the workpiece before turning off the tool.

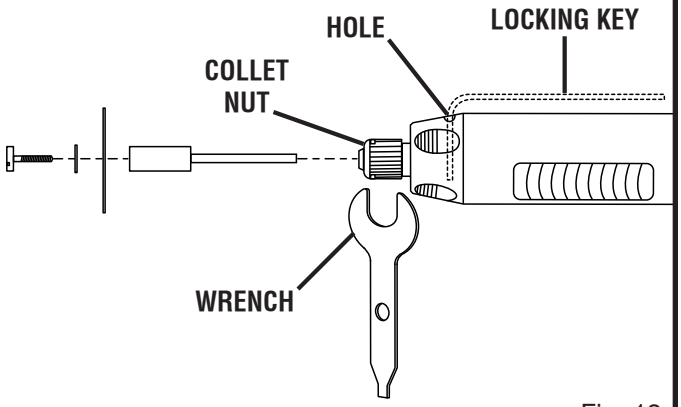

Fig. 13

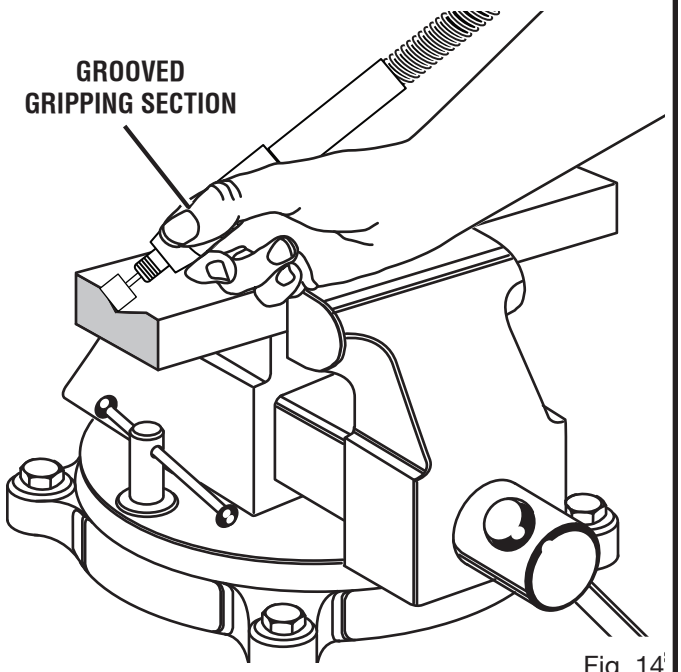

Fig. 14

OPERATION

USING THE PLUNGE CUTTING ACCESSORY

See Figures 15 - 16.

The plunge cutting accessory attaches to the end of the rotary tool. Depth of cut can be adjusted in 1/8 in. increments up to 1 in.

To assemble the plunge cutting accessory:

- Hold the cup-shaped accessory piece with the cup side facing down.
- Insert the cylinder-shaped accessory piece up through the cup-shaped piece. The legs of the cylinder-shaped piece should be facing down.
- Align the groove in the cylinder-shaped piece with the screw in the cup-shaped piece.
- Tighten the screw to secure the cylinder-shaped piece in place.

To install the plunge cutting accessory on the rotary tool:

- Unplug the rotary tool.
- Install desired drill bit into rotary tool.
- Loosen collet sleeve by turning counterclockwise and remove.
- Insert rotary tool into cylinder-shaped piece of the accessory.
- Turn accessory clockwise until it is securely screwed onto the rotary tool.

To use the plunge cutting accessory:

- Loosen the plunge cutting accessory screw until the cup-shaped piece can be easily moved.
- Align cup-shaped piece with the desired measurement depth on the accessory scale.
- Tighten screw until the accessory is secured.
- Connect rotary tool to power supply.
- Hold the tool in front and away from you, keeping the tool bit clear of the workpiece.
- Turn on the tool and let the motor and bit build up to full speed.
- Lower the tool gradually until the bit contacts the workpiece.
- Move the tool continuously at a steady, consistent pace.

  NOTE: The bit has reached the desired depth when the plunge cutting accessory makes contact with the workpiece.
- Use just enough pressure to keep the tool from chattering or bouncing.

NOTE: Heavy pressure will decrease the tool's speed and put a strain on the motor. Normally the weight of the tool alone is adequate for most jobs.

- Lift the tool away from the workpiece before turning off the tool.

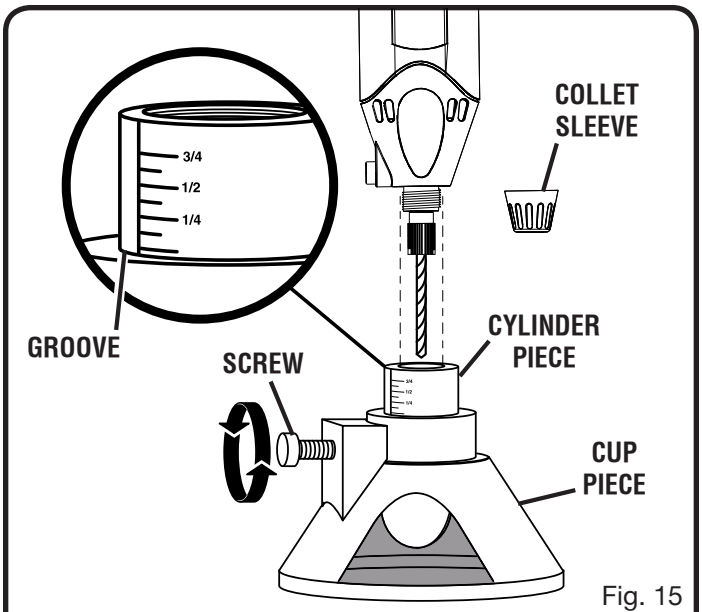

Fig. 15

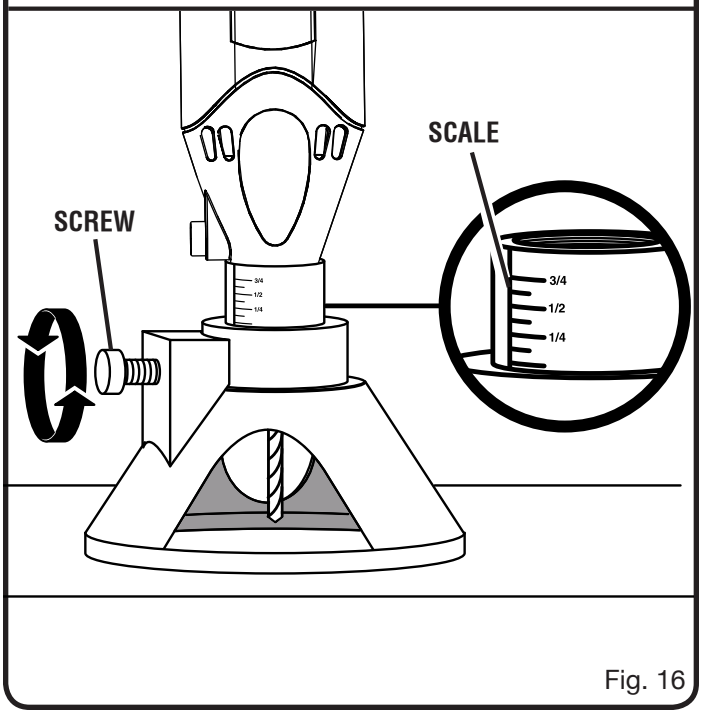

Fig. 16

MAINTENANCE

WARNING:

When servicing, use only identical replacement parts. Use of any other parts may create a hazard or cause product damage.

WARNING:

Always wear safety goggles or safety glasses with side shields during power tool operation or when blowing dust. If operation is dusty, also wear a dust mask.

GENERAL MAINTENANCE

Avoid using solvents when cleaning plastic parts. Most plastics are susceptible to damage from various types of commercial solvents and may be damaged by their use. Use clean cloths to remove dirt, dust, oil, grease, etc.

WARNING:

Do not at any time let brake fluids, gasoline, petroleum-based products, penetrating oils, etc., come in contact with plastic parts. Chemicals can damage, weaken or destroy plastic which may result in serious personal injury.

Electric tools used on fiberglass material, wallboard, spackling compounds, or plaster are subject to accelerated wear and possible premature failure because the fiberglass chips and grindings are highly abrasive to bearings, brushes, commutators, etc. Consequently, we do not recommended using this product for extended work on these types of materials. However, if you do work with any of these materials, it is extremely important to clean the product using compressed air.

LUBRICATION

All of the bearings in this product are lubricated with a sufficient amount of high grade lubricant for the life of the unit under normal operating conditions. Therefore, no further lubrication is required.

NOTES

OPERATOR'S MANUAL

ROTARY TOOL KIT

HT230

⚠ WARNING:

Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:

- lead from lead-based paints,
- crystalline silica from bricks and cement and other masonry products, and
- arsenic and chromium from chemically-treated lumber.

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

• SERVICE

Now that you have purchased your product, should a need ever exist for repair parts or service, simply contact your nearest Authorized Service Center. Be sure to provide all pertinent facts when you call or visit. Please call 1-800-525-2579 for your nearest Authorized Service Center. You can also check our web site at www.ryobitools.com for a complete list of Authorized Service Centers.

• MODEL NO. AND SERIAL NO.

The model number of this product will be found on a plate attached to the motor housing. Please record the model number and serial number in the space provided below.

• HOW TO ORDER REPAIR PARTS

When ordering repair parts, always give the following information:

- MODEL NUMBER HT230
- SERIAL NUMBER _____

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